NASA Developed AIDC Products

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Engineering Directorate
NASA Marshall Space Flight Center

Department of Defense UID IPT

June 3, 2005


NASA Thanks Those Who
Protect Our Freedom

Direct Part Marking

DoD……NASA……
Work Together

story of Collaboration

t Part Marking Project

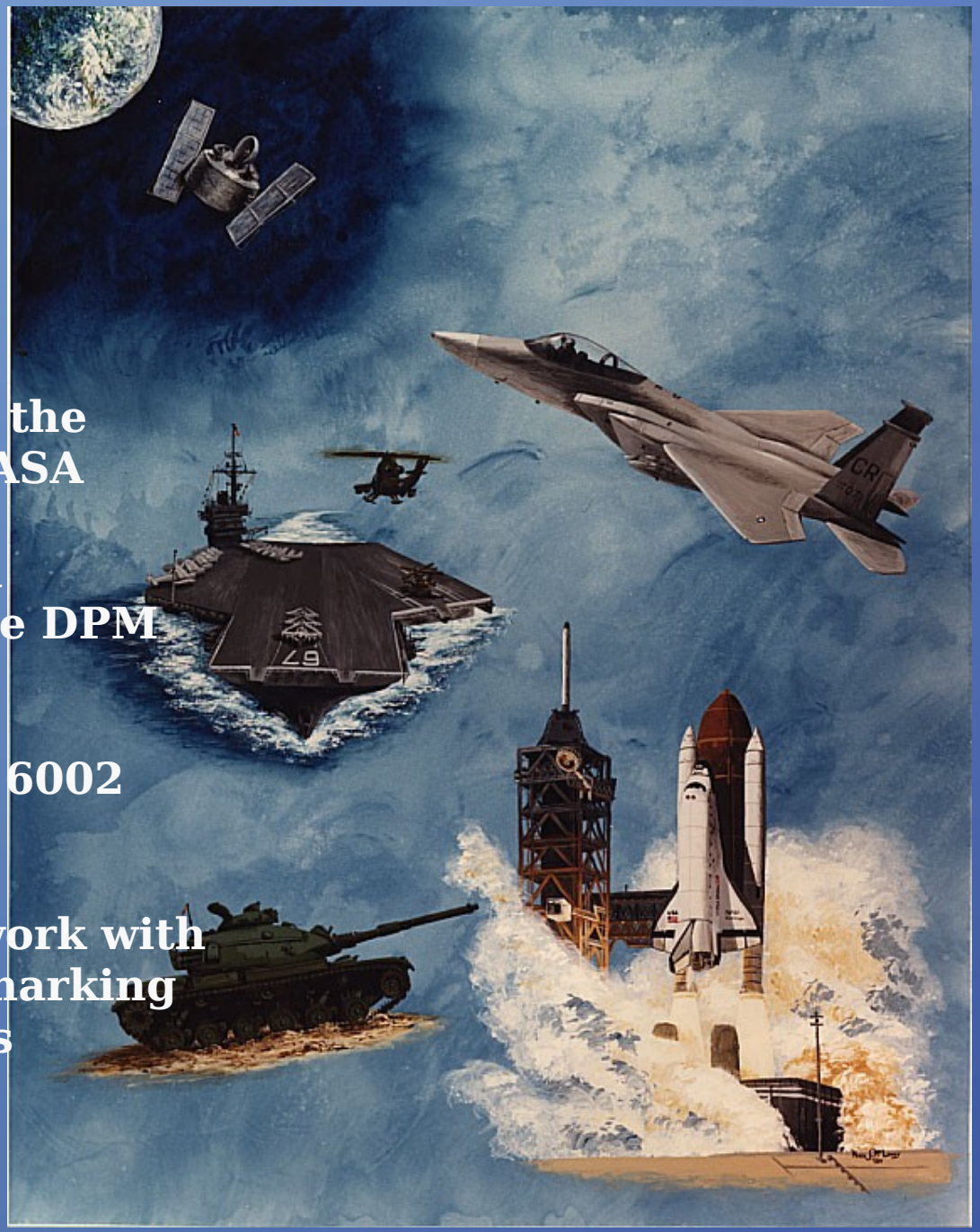
1984 laser etching studies by the USAF (Jane Channell) with NASA

1984-1988 Air Force provided consulting services for Shuttle DPM

2001 DoD, NASA and others developed the DPM Standard 6002 and Handbook 6003

2002 – 2005 DoD and USCG work with NASA and licensees…NCMS marking development and pilot studies

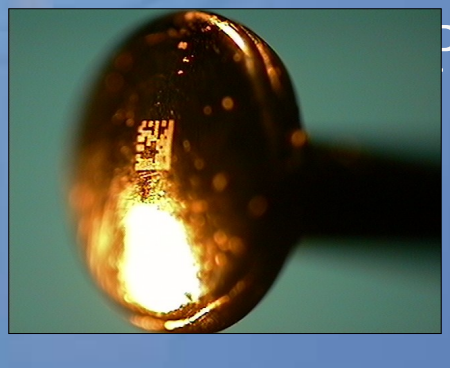
2005- UID initiative explores common ground



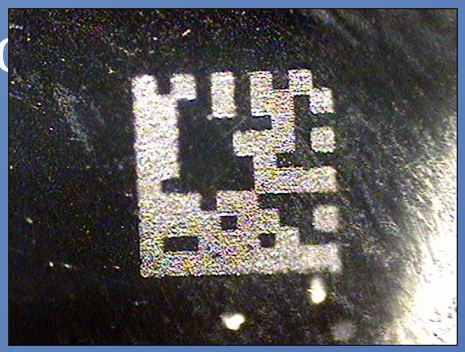
NASA Direct Part Marking Project

"Challenger Return to Flight" Configuration Mgt Imp
2001 Result....NASA Standard and Handbook

NASA's Primary Emphasis
....Item-Level
Traceability



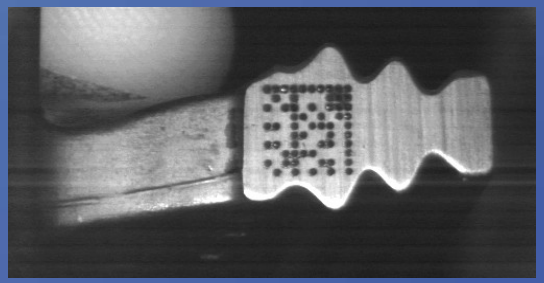
Pied



....Track the

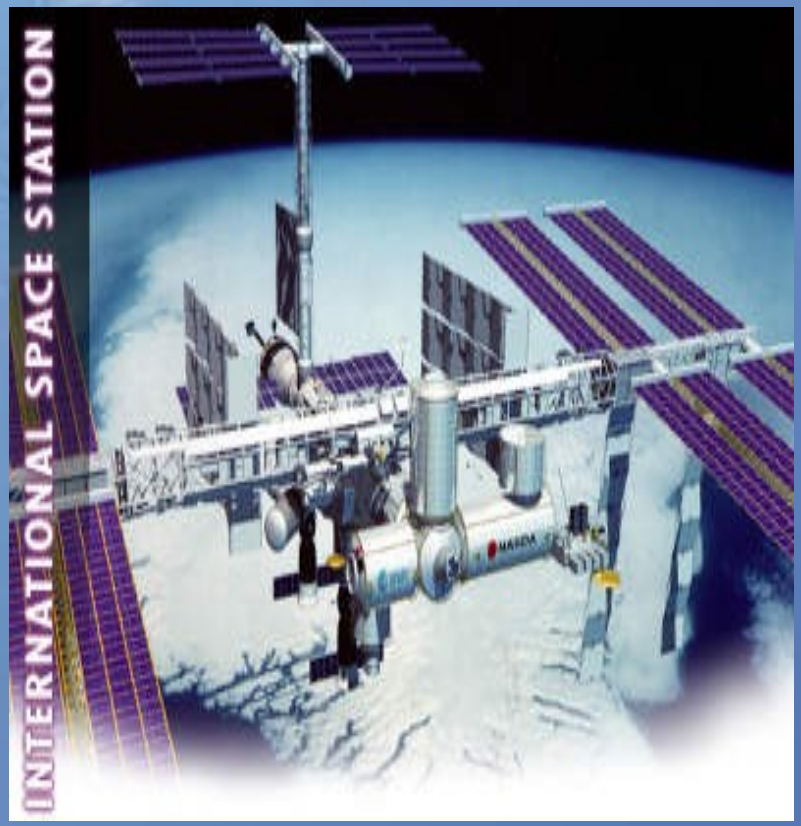
Left: 10x10 matrix symbol
head of a straight pin

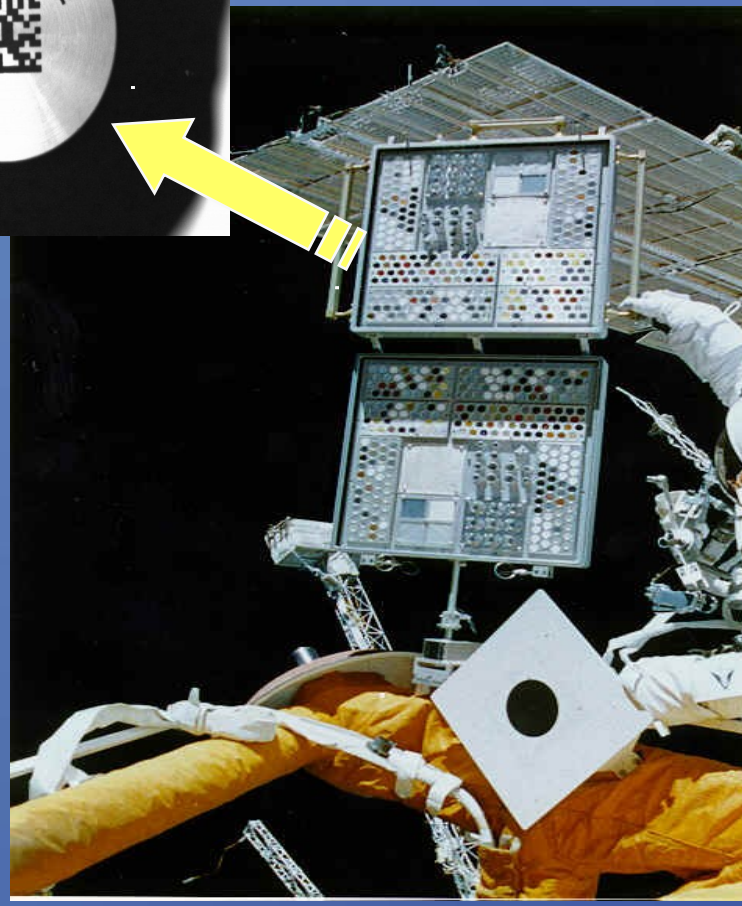
Below: 10x10 matrix syml
the side of a turbine blad



Know the Pedigree
....Know who made it
....Know who marked it
....Know who stands behind it

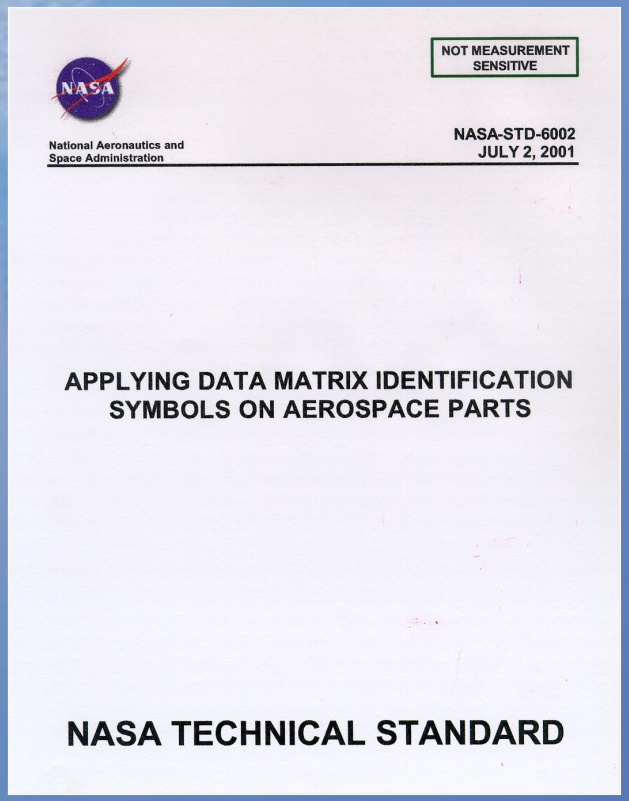
International Space Station Materials Experiment

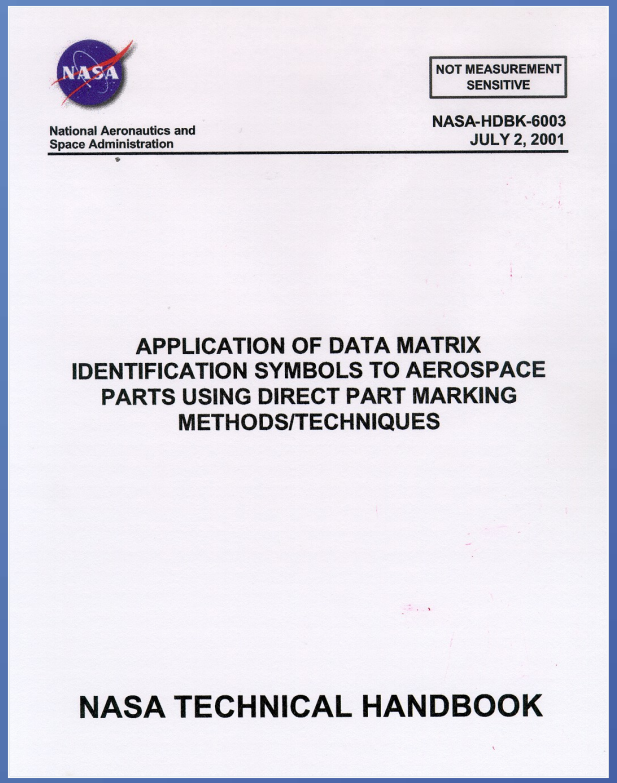




NASA Direct Part Marking Project

A Direct Part Marking Standard 6002 and Handbook 6
Currently in final review for Revision B





http://standards.nasa.gov

Free Download….Public Site

Read Through Paint

Welcome to The CTMA Connector, a monthly newsletter designed to provide news and ideas about the Commercial Technologies for Maintenance Activities (CTMA) program. The CTMA program is a joint Department of Defense/National Center for Manufacturing Sciences (DoD/NCMS) effort promoting collaborative technology development between industry and the DoD maintenance and repair facilities. This newsletter highlights ongoing projects, serves as a forum for promoting new project ideas, and provides other news of interest to the program.

The CTMA Connector

Commercial Technologies for Maintenance Activities

An NCMS/DoD Partnership

Direct Part Marking (DPM) For High Strength Metals and Painted Over Articles

Problem: DPM of high strength metals & painted over articles is difficult.
The overhaul cycles of the high strength steel components typically require shot blast or a grit blast process that only a fused on data symbol can survive. Other parts requiring Direct Part Marking requires the data symbol to get covered with paint to protect the part from corrosion. The problem is to find a non-invasive method that allows for the rapid fusion of a DPM to high strength metal substrates. Another related problem is to find a way to apply direct part marks to paint over articles allowing the data symbol to be read through the paint

Solution: Find a non-invasive method that allows for the rapid fusion of a DPM to high strength metal substrates.

NCMS Contact: Steve Hale, steveh@ncms.org, 734-995-2195

May 2005

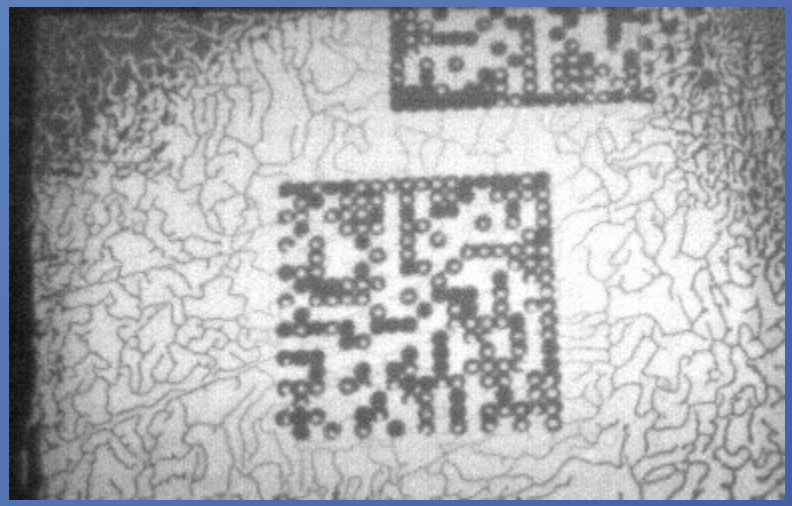
NASA Read-Through-Paint

Magnet

Handheld Reader

A portable magnetic scanner about the size of a hair dryer

Decodable images (right) through 15 mils of copy paper or paint (6 layers)



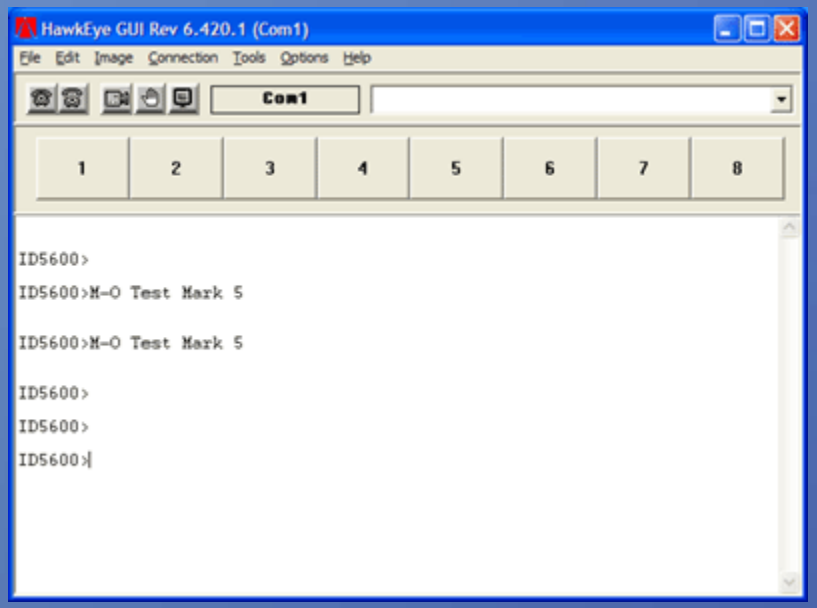
Commercially available
Licenses available

Licenses: RVSI

ASA Read-Through-Paint Products

agnetic Marks on Coast Guard Plane Door

Mark Survived 8 Months of Duty



Mark Decoded

Mark Easily Imaged

NASA Read-Through-Paint Products

Ultrason

Handheld Rea

A portable ultrasonic scanner about the size of a hair dryer

Decodable images (right) through 15 mils of copy paper or paint (6 layers)

Commercially available
Licenses available

imperium
Advanced ultrasonic imaging

AcoustoCam™ I400

Ultrasound Imaging Camera

* PC not included

For Nondestructive Testing of Materials

System Overview

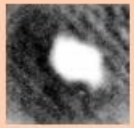
What is it?

The AcoustoCam™ I400 is a novel ultrasound camera system provides inspectors with a real time view of subsurface faults. This represents a user friendly alternative to an A-scan thickness gauge or flaw detector.

What is it used for?

The AcoustoCam™ I400 can immediately provide information about subsurface faults including:

- Corrosion
- Cracking
- Voids
- Impact Damage
- Delaminations



This image of a void inside of a composite material was taken in 1/30 second.

How is it used?

Inspectors need only put some ultrasound gel up to the part under study, place the AcoustoCam™ I400 probe up to the part and begin imaging. The images are shown on an LCD integrated into the back of the unit. Once a fault is detected, the image can be saved for later evaluation.

Technical Specifications

Included Components:	-Camera subassembly with imaging array, F/1 acoustic lens, source transducer, pulser control unit, sample focusing target, cables, User's manual
Frame Rate:	-30 fps
Ultrasound Dynamic Range:	-14 bits
Grey Levels:	-256
Frequency Response:	-1 to 4 MHz
Video Output:	-RS170 EIA
Operating Temp. Range:	-32° to 104°F (0° to 40°C)
Storage Temp Range:	-32° to 104°F (0° to 40°C)
Power:	-120V AC

Specifications subject to change without notice

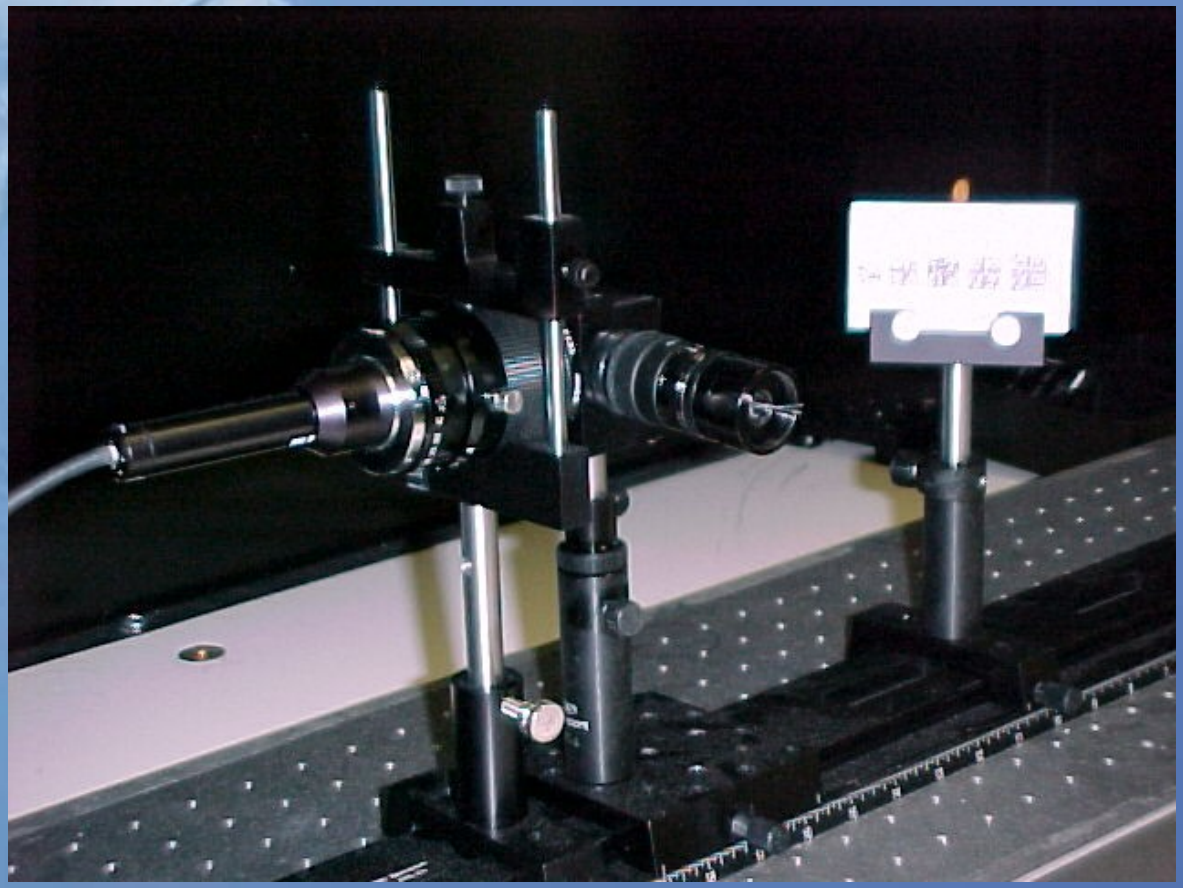
Imperium, Inc.
1738 Elton Road, # 218
Silver Spring, MD 20903
(301) 431-2905
(301) 431-0200
Email: sales@imperiuminc.com
Web: http://www.imperiuminc.com

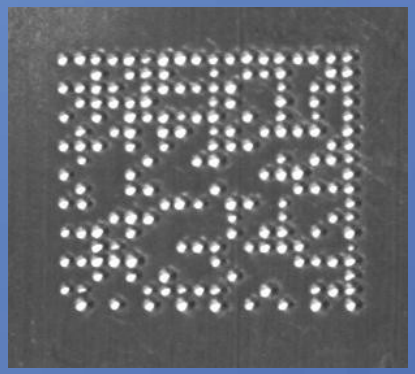
imperium
Advanced ultrasonic imaging

Autofocus

Angular and Distance Reads

Autofocus Distance Scanner





No contrast mark on smooth aluminum

NASA Optical Scanner For Visible Marks

Licenses available

Shiny screwdriver

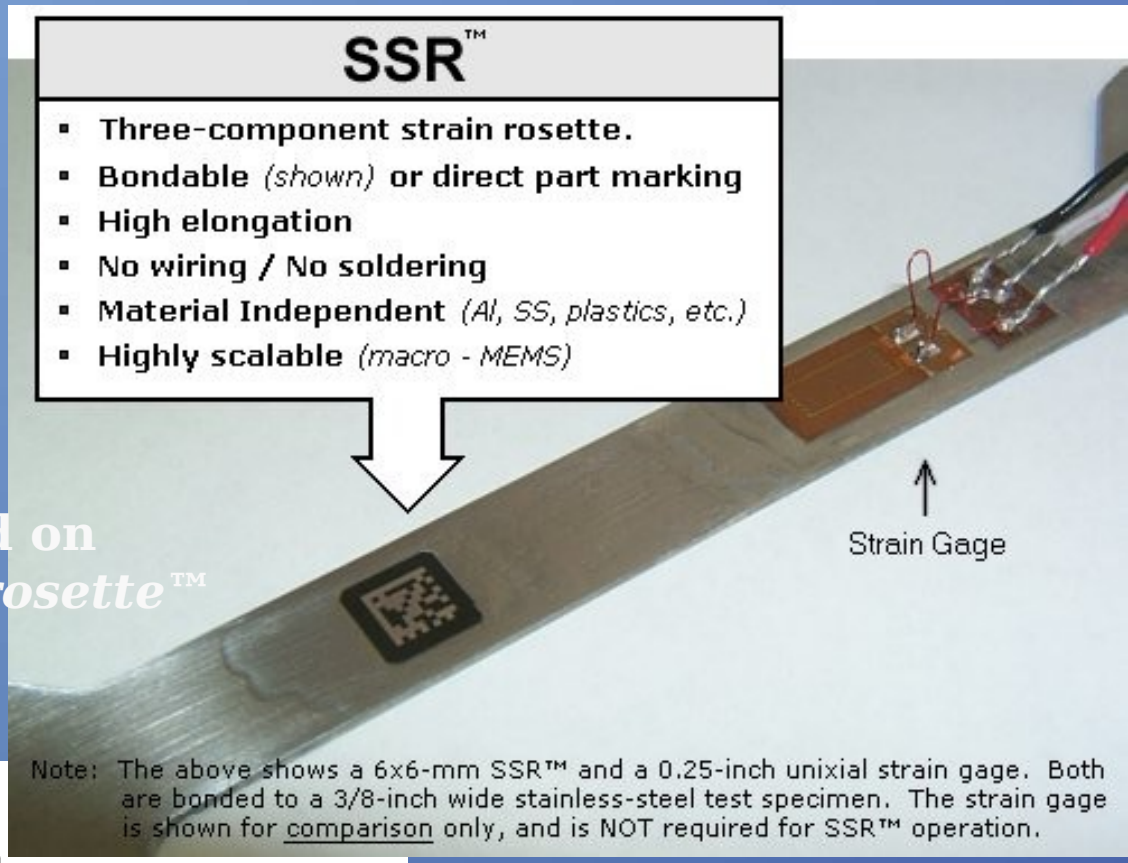

Stretch Codes

Unusual Applications

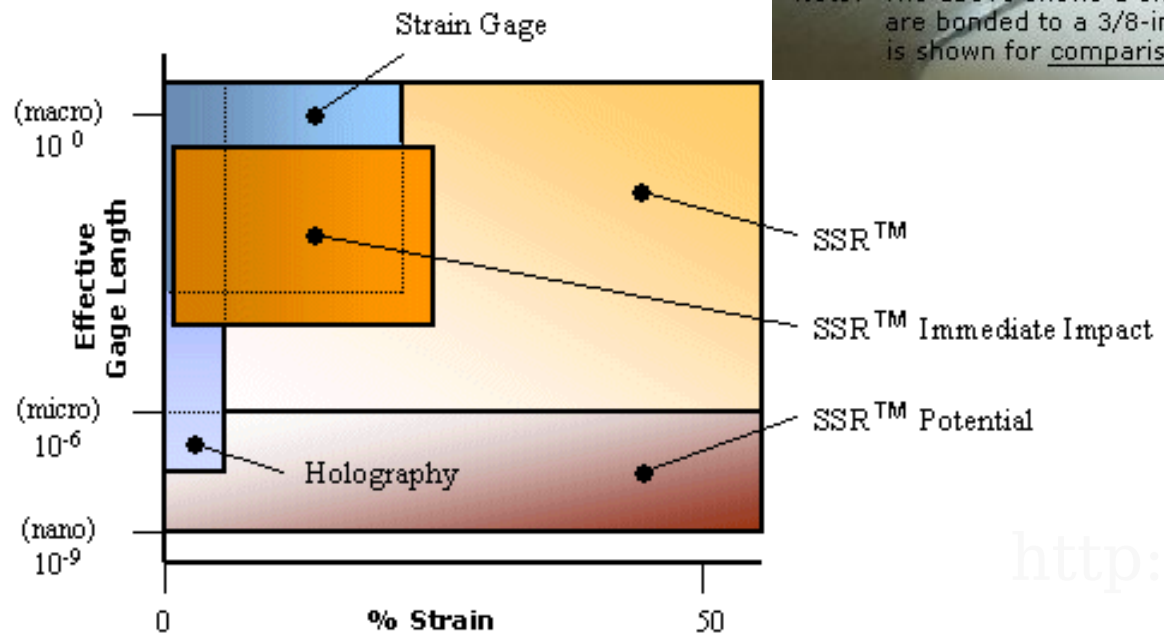
Direct Measurements, Inc. introduced a universal strain-gage alternative based on proprietary *symbolic strain rosette*™ (or SSR™) technology.

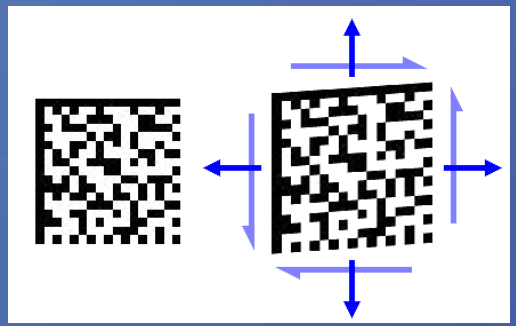
SSR™

- Three-component strain rosette.
- Bondable *(shown)* or direct part marking
- High elongation
- No wiring / No soldering
- Material Independent *(Al, SS, plastics, etc.)*
- Highly scalable *(macro - MEMS)*



Note: The above shows a 6x6-mm SSR™ and a 0.25-inch unixial strain gage. Both are bonded to a 3/8-inch wide stainless-steel test specimen. The strain gage is shown for comparison only, and is NOT required for SSR™ operation.



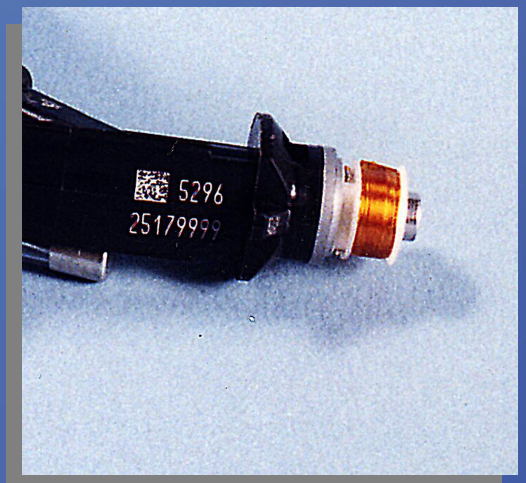


http://directmeasure.com/


NanoCodes

Nanocodes

X-ray Fluorescence….
A New Way To Find……
……Unapproved Part

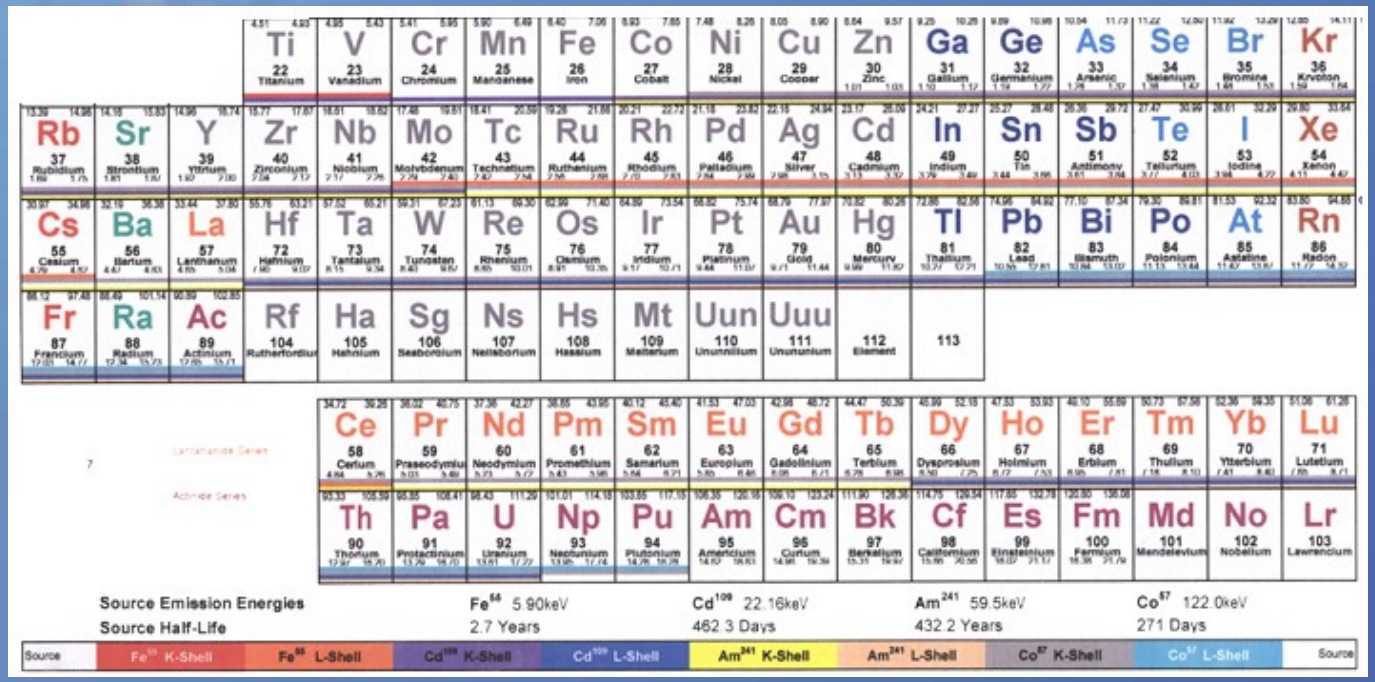


Nanocodes

ndard XRF Detection Rang

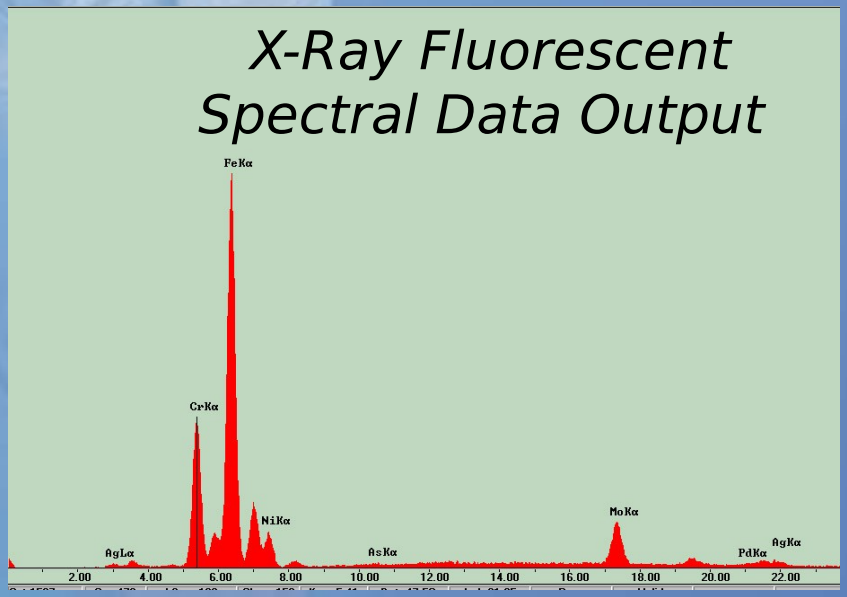
Titanium, Nickel, Steel alloys

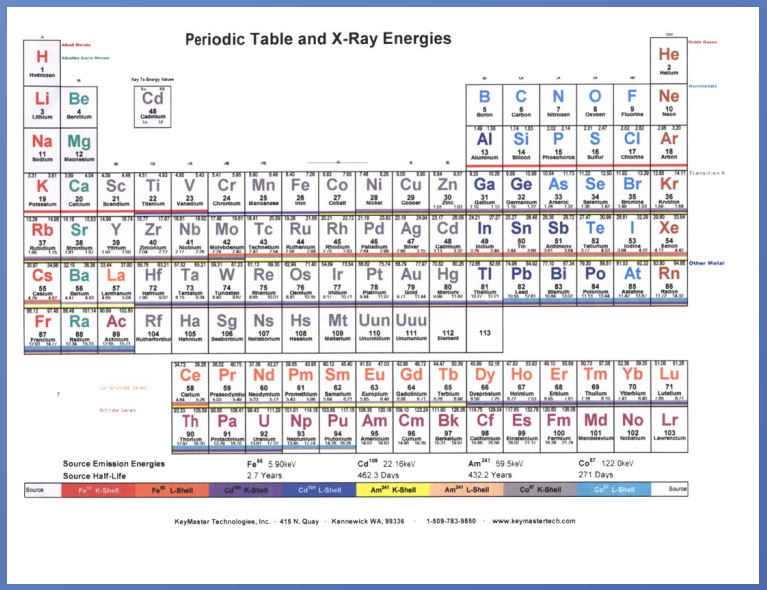
General analyses for heavier elements



Licensee: KeyMaster Technologie

Nanocodes





Conversion

- X-ray fluorescent anal
  detects elements pres
- Software converts to A
  and code of choice
- Can be matched with
  codes in other places

Nanocodes

If you had to put a bar code inside a softball, then read it through the cover how would you do it?

Let XRF Put the Bar Codes Inside!!!